4 Corners Air Quality Task Force
Existing Modeling Summary
May 2006

Overview of Current Air Quality in the Four Corners Region

In the Four Corners region, the air quality currently meets all National Ambient Air Quality Standards, or NAAQS. See http://www.epa.gov/air/criteria.html. The monitoring shows that the region is very close to exceeding the health-based standard for ozone. According to data from Mesa Verde National Park, the ozone trend is increasing; ammonium is increasing; there is no trend (as of 2004) in nitrates; and sulfates are decreasing. Mercury advisories have been issued for lakes in all four of the states in the region. Visibility is degraded throughout the region. All four states are currently working on plans to improve visibility. These plans will be submitted to the U.S. Environmental Protection Agency in January 2008. The purpose of the Four Corners Air Quality Task Force is to develop strategies to improve the air quality in the region.

There are multiple jurisdictions in the region. The Four Corners states include New Mexico, Colorado, Utah and Arizona. Tribal lands in the Four Corners region include the Navajo Nation, Ute Mountain Ute, Southern Ute, and Jicarilla Apache. Federal lands in the region are managed by the U.S. Department of Interior, Bureau of Land Management, National Park Service and Bureau of Reclamation, and the U.S. Department of Agriculture, Forest Service.

Existing Modeling Studies

An Air Quality Modeling Analysis for the San Juan County Early Action Compact (Ozone) was prepared by Alpine Geophysics, LLC and Environ International Corporation, Inc. for the New Mexico Air Quality Bureau. The report includes both base case and future case modeling for ozone. Maintenance for Growth and Control Strategy Modeling was also done for the Early Action Compact. Go to: http://www.nmenv.state.nm.us/aqb/projects/Ozone.html.

San Juan County Early Action Compact: 2002 Base Year Emissions Inventory
Categories of Sources modeled: Area, on-road mobile, off-road mobile, stationary point sources, oil and gas development sources, and biogenics
Model used: Emissions Processing System (EPS2x) for CAMx Photochemical modeling
Output: NOx, CO, VOC tons/day for sources in New Mexico counties
*NEI used to determine 2002 point and mobile source emissions for San Juan County

San Juan County Early Action Compact: 2007 Future Year Emissions Inventory:
Growth and Control strategy modeling based on population and industry growth and the effects of emissions control currently 'on the books.'
Categories of sources modeled: Area, on-road mobile, off-road mobile, stationary point sources, oil and gas development sources, and biogenics
Model used: EPS2x, CAMx Photochemical
Output: NOx, CO, VOC (tons/day) for sources in New Mexico counties, San Juan County ambient ozone concentrations (ppm)

Summary: The results of the EAC modeling indicates that San Juan County is expected to remain in attainment of the 8-hour ozone standard through 2007 by a substantial margin. Concentrations of ozone are predicted to remain nearly the same during the next three Years (2004-2007). Modeling predicted the Substation monitor's 2007 design value to be 0.07437 ppm and the Bloomfield monitor's 2007 design value to be 0.07249 ppm. The modeled impact of adding two new power plants in the Four Corners region is projected to have minimal impact on 8-hour ozone concentrations. If the estimated year 2012 development of the San Juan Basin oil and gas field is accelerated to actually occur three years from now (i.e., by 2007) the modeled impact on 8-hour ozone concentrations is expected to be insignificant. Impacts on 8-hour ozone concentrations were also insignificant when on-road motor vehicle emissions rates were increased to reflect an older vehicle fleet, and when the area source emissions inventory was doubled. In addition, the impact of year 2012 emissions on 8-hour ozone concentrations was also modeled to be minimal. The impact on 8-hour ozone concentrations was greatest when biogenic VOC and NO_x were doubled, indicating that an exceedence of the 8-hour ozone NAAQS in San Juan County in the future will require a significant increase in VOC emissions and/or heightened VOC reactivity.

The Western Regional Air Partnership (WRAP) has performed modeling for states in support of development of plans for regional haze.

2004 Regional Modeling Center Final Report (08/24/05)
http://www.wrapair.org/forums/aqmf/docs.html
Categories of sources modeled: Stationary area, road dust, windblown dust, anthropogenic fugitive dust, agricultural NH_3, on-road mobile, nonroad mobile, stationary point, offshore, fire, biogenic
Model used: CMAQ model, CAMx
Resolution: spatial resolutions of 12- and 36 km.
Output: modeling for base year 2002 area source emissions including: CO, NOx, VOC, NH_3, $PM_{2.5}$, PM10, PM_C, SO_2 emissions density for WRAP states.

An improved Ammonia Inventory for the WRAP Domain (04/08/05)
http://pah.cert.ucr.edu/aqm/308/emissions_reports04.shtml
Categories of sources modeled: livestock, fertilizer usage, domestic sources, native soils, and wild animals
Model used: A GIS-based ammonia emissions modeling system
Resolution: spatial resolutions of 12- and 36 km.
Output: NH_3 source emissions by state (tons)
Summary: The 2002 ammonia emission inventory for the WRAP domain is dominated, on a regional scale by fertilizer application and livestock operation emissions. The result is entirely consistent with the current understanding of ammonia emission within the air quality and emissions modeling community. Ammonia emission from native soils, while a major component of the overall inventory, remains highly uncertain. This uncertainty arises mainly from the current thinking of the research community with respect to

whether soils act as a source or a sink of ammonia. This issue is a topic of current research. Ammonia emission from domestic sources, while only a small contributor of the total regional ammonia inventory, can be a major source of emissions on smaller, urban scales. The wild animal ammonia emissions are only a small portion of the inventory, but have included at the request of the WRAP Emissions Forum. (p. 4.1, Final Report Volume 1: An Improved Ammonia Inventory for the WRAP Domain, prepared by Gerald E. Mansell, ENVIRON International Corporation)

Maps of the Four Corners Region

These maps of the region of concern for the Four Corners Air Quality Task Force is from the Memorandum of Understanding dated signed by the federal and state agencies coordinating this project.